



Chapter 3: Introduction to SQL

Database System Concepts, 7th Ed.

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Nested Subqueries

- SQL provides a mechanism for the nesting of subqueries. A **subquery** is a **select-from-where** expression that is nested within another query.
- The nesting can be done in the following SQL query

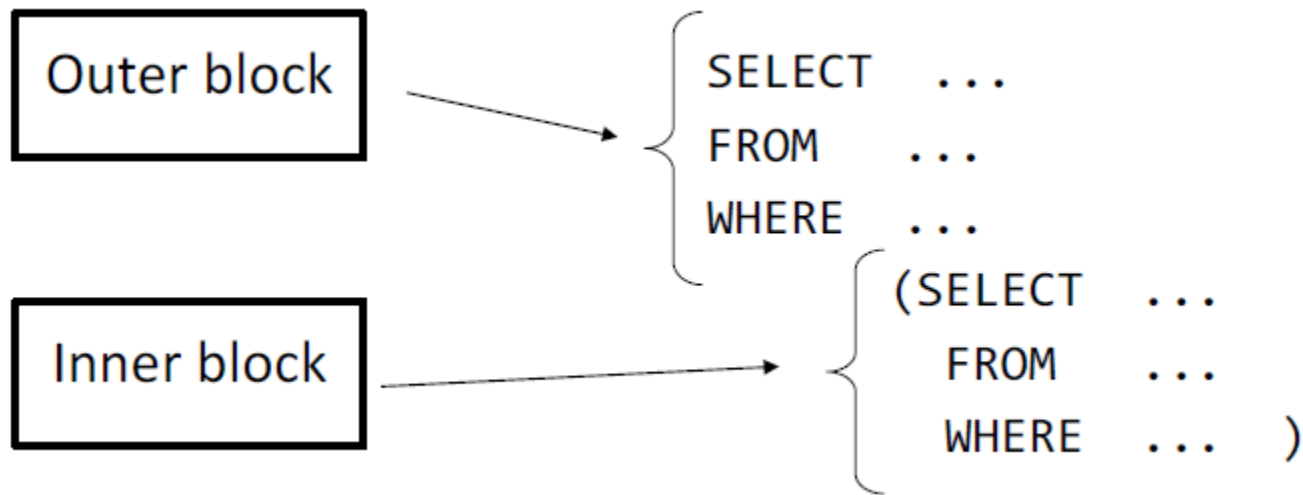
```
select  $A_1, A_2, \dots, A_n$   
from  $r_1, r_2, \dots, r_m$   
where  $P$ 
```

as follows:

- **From clause:** r_i can be replaced by any valid subquery
- **Where clause:** P can be replaced with an expression of the form:
$$B \text{ <operation> (subquery)}$$
$$B$$
 is an attribute and <operation> to be defined later.
- **Select clause:**
 A_i can be replaced by a subquery that generates a single value.



Nested Subqueries





Subqueries in the Select Clause



Scalar Subquery

- Scalar subquery is one which is used where **a single value is expected**
- List all departments along with the number of instructors in each department

```
select dept_name,  
       ( select name  
         from instructor  
         where department.dept_name = instructor.dept_name)  
       as instructor  
from department;
```
- Runtime error if subquery returns more than one result tuple



Scalar Subquery

- Liste el nombre del empleado y el nombre del departamento donde trabaja. Si el empleado no trabaja en ningún departamento debe aparecer en el listado.

```
SELECT
  e.employee_name,
  d.department_name
FROM
  employees e,
  departments d
WHERE
  e.department_id =
  d.department_id;
```

EMPLOYEE_NAME	DEPARTMENT_NAME
CLARK	ACCOUNTING
KING	ACCOUNTING
MILLER	ACCOUNTING
JONES	RESEARCH
SCOTT	RESEARCH
ADAMS	RESEARCH
FORD	RESEARCH
SMITH	RESEARCH
WARD	SALES
ALLEN	SALES
JAMES	SALES
BLAKE	SALES
MARTIN	SALES

```
SELECT
  e.employee_name,
  (
    select department_name from departments d
    WHERE e.department_id = d.department_id
  ) as department_name
FROM
  employees e;
```

EMPLOYEE_NAME	DEPARTMENT_NAME
SMITH	RESEARCH
ALLEN	SALES
WARD	SALES
JONES	RESEARCH
MARTIN	SALES
BLAKE	SALES
CLARK	ACCOUNTING
SCOTT	RESEARCH
KING	ACCOUNTING
TURNER	<u>(null)</u>
ADAMS	RESEARCH
JAMES	SALES
FORD	RESEARCH
MILLER	ACCOUNTING